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DRINKING PATTERNS OF AMERICAN UNIVERSITY STUDENT: TESTING REDUCTION OF CONSUMPTION THEORY 1982-1994.

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Paper Presented, Department of Psychology, Research Colloquium, University of Dundee, Dundee, Scotland, October, 1994

ABSTRACT

The *purpose* of this descriptive cross-sectional study was to test the hypothesis that demographic variables are less important now than in the past in relationship to drinking behaviours among collegians in the United States. Also the purpose was to test "reduction of consumption" theory by comparing students from the same or equivalent colleges and universities over five time periods beginning in 1982 from data collected in a long term study of college student drinking patterns and problems by the presenter (R. Engs) and David J. Hanson. *Methods*: the *Student Alcohol Questionnaire* was administered to over 12,000 university students from every state during the 1993-1994 academic year. The SAQ had been administered to the same universities since 1982. The sample size was 10,247 in 1993-1994; 6,751 in 1990-1991; 6,872 in 1987-1988; 4,719 in 1984-1985; and 5,504 in 1982-1983. *Results*: Among drinkers a significantly higher proportion of men, whites, under 21 year olds, Roman Catholics, individuals to whom religion was not important, those with low grade point averages, fraternity/sorority members, living in small communities, the North Eastern part of the United States, at private schools and colleges under 10,000 exhibited heavier drinking and a higher incidence of problems related to drinking. When the samples for the five time periods were assessed, the results showed a significant ($p < .001$) increase in the percent of abstainers (17.7 to 26.8) and a decrease in the mean number of drinks consumed per week among all students (14.3 to 13.1). There was a significant decrease in the percent of students who exhibited four drinking and driving related variables. On the other hand, a significant increase of most health/personal, social/academic, and legal/violent problems related to alcohol was found. In *conclusion* the results do not support the hypothesis that few differences in drinking patterns would be found within traditional demographic variables due to societal changes. Likewise reduction, or control, of consumption theory was supported only for a decrease in drinking and driving variables and the mean amount of alcohol consumed.

1 Tables and material from R.C. Engs, Indiana University, Bloomington, IN and D. J. Hanson, SUNY, Potsdam, NY 1982 through 1994 data collections.

INTRODUCTION

Since the late 1960s, many social changes have occurred in the United States leading to profound changes in the structure of the American society. These include changes in gender roles and behavioral expectations, changes in socio-economic status of racial and ethnic groups, increased religious inter-marriage, single parenthood, and social pressures for earlier maturity of youth and consumed and a decrease in rural and urban differences have occurred. In addition, a change in the law concerning the age at which alcohol can be legally consumed.

These societal changes may be reflected in drinking patterns and problems among collegians. Various personal, academic, and legal problems have been associated with irresponsible alcohol consumption along with demographic characteristics. Gender has been one of the most important predictors of problem drinking. The majority of studies in western cultures have shown that a higher percentage of men drink and experience drinking-related problems compared to women. Besides gender, other variables related to drinking behaviours among college students include religious background, religiosity, grade point averages, fraternity membership, size of the institution and its surrounding community (Engs, 1977; Engs and Hanson, 1985,1990; Loughlin and Kayson, 1990; Saltz and Elandt, 1986; Billingham, Post and Gross 1993; Gustafson 1993)

Some public policy makers assume that if the availability of alcohol and its consumption can be reduced, fewer problems related to alcohol would occur. This hypothesis is termed the *reduction* or *control of consumption* model. The model tends to assume that alcohol is the sole cause of all drinking problems and the amount of alcohol consumed determines the extent of drinking problems in a culture. Educational program using this model stress that any alcohol consumption is problematic and encourages abstinence and even universal prohibition (Single, 1988; Lauderdale, 1977; Schmidt, 1985). Therefore, in order to reduce problem drinking among collegians in the United States, under this hypothesis, it is assumed that if the "drinking age" for alcohol is 21 years of age, a decrease in alcohol problems among youth should result. In the United States, public policy legislation demanded that if a state did not have a 21 year purchase law by 1987, the state would lose federal highway funding.

Purpose of the study

Because of possible changes in drinking patterns within demographic categories, a purpose of this study was to test the hypothesis that demographic variables are less important now than in the past in relation to drinking behaviors and to gather current baseline information which could be used for curriculum development. Another purpose of this study was to test Reduction of Consumption theory. Based upon the mandate of a 21-year old alcohol purchase law in the United States in 1987, it is hypothesized, based upon this model, that fewer students would consume alcohol and there would be fewer personal, academic, legal, and social problems related to drinking over 12 years.

METHODS

The Sample

The sample is part of an ongoing study of drinking patterns and problems of students attending baccalaureate degree granting four-year colleges and universities from every state in the United States that was begun in 1982 by the presenter (Ruth C. Engs, Indiana University) and David J. Hanson, SUNY, Potsdam. Institutions were originally selected to form a "quota sample." Universities were chosen to be representative of all four-year institutions of higher education in terms of financial support (public or private) and size (over and under 10,000 student enrollments). For example, approximately 65% of students attend state supported schools in terms of financial control in the United States (Snyder, 1993). This same proportion of institutions, from each state, were randomly selected from a list of colleges and universities which had health, physical education or sociology departments. The department head was contacted about participation in the study. If an institution declined to participate, another institution with similar demographics, eg, state supported, small community, with over 10,000 students, in the same state was then asked to take part. Faculty teaching general courses who had a probably of students from every class level were asked to administer the Student Alcohol Questionnaire to students for in-class completion. The return rate for complete and usable questionnaires exceeded 97%. This "convenience sample" is limited to students in classes from institutions where instructors were willing to distribute the questionnaire.

The resulting sample for the 1993-4 academic year consisted of 12,081 students from 168 colleges. To compare possible changes in drinking patterns and problems over time, the same or equivalent universities were selected for each of five time periods. The sample over the twelve year period contained students from 128 colleges and Universities. Many were the same throughout the period, while others were matched for institutional characteristics. Sample sizes for each of these time periods were: 10,247 in 1993-1994; 6,751 in 1990-1991; 6,872 in 1987-1988; 4,719 in 1984-1985; and 5,504 in 1982-1983. Because of its large size, the sample had high power for detecting significant difference. However, the large sample size also introduces the chance of type I errors. Therefore, significant differences at the .05 level of confidence must be viewed with caution.

The Instrument

The *Student Alcohol Questionnaire* (SAQ), was used to collect data (Engs 1975, 1977). The questionnaire includes various demographic items; six questions concerning quantity and frequency of wine, spirits and beer consumption; and 19 items regarding possible negative health/personal, social/academic, legal/violence or drinking/driving consequences resulting from alcohol consumption. The instrument has demonstrated internal consistency reliability of .79 for all items, excluding demographic factors. An updated reliability analysis (Engs and Hanson 1994) has demonstrated Spearman-Brown reliability coefficients of .84 for the Quantity/Frequency and .89 for

the Problems Related to Drinking sub-scales. The values of Cronbach alpha reliability were .86 and .92 respectively, for these sub-scales.

Data Analyses

All calculations were accomplished on the Indiana University VAX computer using the SPSS program (Norusis, 1990).

Quantity/Frequency drinking level

Based on a method suggested by Cahalen (1969) and adapted by Engs (1977), a quantity/frequency level of drinking was calculated to determine the categories of Abstainer, Light to Moderate Drinker, and Heavy Drinker.[2] The proportion of students in each of these categories in the total 1993-4 sample and over the five time periods were subjected to Chi-Square analysis

Mean number of drinks per week

Following a method developed by Lemmens et al. (1988) and adapted by Gliksman et al. (1989), the mean number of drinks consumed on a weekly basis was computed. For these calculations the instrument assessed the usual frequency and quantity of beer, wine and spirits consumed by students. The frequency and quantity response categories were assigned constant values.[3] To compute the total number of drinks consumed on a weekly basis, a mean score was calculated by multiplying the recoded quantity by the recoded frequency weight for each beverage type. These three numbers were then summed to give the total mean number of drinks consumed per week. A one-way analysis of variance was used to compare the mean number of drinks consumed by the demographic variables in the 1993-4 data and over the five time periods. The Scheffe was used as a *post-hoc* test to determine where differences occurred.

Problems associated with drinking

Only students categorized as drinkers were asked to report on problem behaviours associated with drinking during the previous 12 months. Chi-square analyses were used to determine possible

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2 The Quantity-Frequency measure for each subject was calculated from the beverage (beer, wine or distilled spirits) most frequently used and the amount consumed on a typical occasion. Drinking category of **Abstainer**: drinks less than once a year or not at all; **Light to Moderate** Drinker: drinks at least once a year, or once a month, but not weekly, and consumes no more than 5 drinks per occasion; drinks at least once a week, but not daily, and consumes no more than 4 drinks per sitting, or once a day but consumes no more than 1 or 2 drinks. **Heavy Drinker**: 6 or more drinks at any one sitting once a week or more.

3 Loading values used to calculate mean number of drinks per week. For the usual frequency of drinking by each respondent: every day = 7.0; at least one a week but not daily = 3.5; at least once a month but not weekly = 0.5; more than once a year but not monthly = 0.12; one a year or less = 0.02; never =0. Values for number of drinks of beer, wine, distilled spirits: 7+ = 7.5; 5-6 = 5.5; 3-4 = 3.5; 1 - 2 = 1.5; < 1 = 0.5; 0 = 0.

differences in the percentages of students exhibiting each of the 17 problems at each time period. A mean problem score was calculated for each student by assigning one point for each of the 19 problems experienced at least once during the previous 12 months. These scores were subjected to t-tests, and one-way analysis of variance and post-hoc Scheffe tests. In addition Chi-square analyses were used to determine possible differences in the percentages of students exhibiting each of the 19 problems within each demographic variable over the five time periods.

RESULTS

The 1993-4 sample

For the 1993-4 sample, 72.0% were drinkers. One in five were heavy, sometimes called "binge" Drinkers and half were classified as Light/Moderate Drinkers. Of drinkers, 28.4 % were Heavy Drinkers. The mean drinks consumed per day for drinkers was 10.9 drinks per week (See Table 1).

Quantity-Frequency and mean drinks per week 1993-4 sample

Personal Demographic Characteristics Among Drinkers

Gender: Among drinkers men and women differed significantly in quantity and frequency of drinking ($p < .001$, $X^2=792.41$). Of males 21.8 and of females 30.9 did not drink. Among drinkers, significantly ($p < .001$, $X^2 =65.7$) fewer women were heavy drinkers compared to men (17.9% and 43.1% respectively). Males reported significantly ($p < .001$, $t=23.4$) more problems related to drinking compared to females (see Table 1).

Race: A significant difference in student drinking patterns due to race was found. Among drinkers ($p < .001$, $X^2 =94.1$) twice as many whites (30.4%) compared to non-whites (15.9%) were Heavy Drinkers. White (10.6) drinkers consumed significantly ($p <.001$, $t=18.9$) more than twice as many drinks per week compared to non-white drinkers (4.2). Whites had a higher mean problem score than did non-whites ($p < .001$, $t=21.8$).

Age: Among drinkers, a significantly higher percent ($p < .001$, $X2 =55.4$) of underage students were heavy drinkers compared to legal age students. Among the legal-aged drinkers, there was a higher percentage of light-moderate drinkers but no difference in the mean number of drinks per week nor differences in mean number of problems between underage and legal age students.

Religion: Almost half of all Protestants, whose religion does not allow drinking (Mormon, Baptist, Pentecostal, etc.), and about a fifth of Protestants whose religion does allow drinking were abstainers. In contrast few Catholics and Jews fell into this category ($p < .001$, $X2 =58.3$). Among drinkers, Catholics ($p < .001$, $X2 =61.3$) had the highest percentage of Heavy Drinkers (33.2%) compared to the other groups. The Scheffe post hoc test for the MANOVA revealed that Catholics and Jews

consumed the highest mean number of drinks per week ($p < .001$, $F=102.2$) compared to the two Protestant groups. A significant difference in mean problem scores ($p < .001$, $F=102.3$) between religious groups, with Catholics having the highest mean was revealed.

Importance of Religion: Among drinkers, individuals to whom religion was not important were more likely to be Heavy Drinkers ($p < .001$, $X2 = 85.3$). The less religious also consumed twice as many drinks compared to very religious individuals ($p < .001$, $t=18.1$). Those to whom religion was not important had higher reported problem ($p < .001$,$t=19.2$),

Academic and Social Characteristics

Class standing: Table 1 reveals that the drinking patterns of students changed by year in school ($p < .001$, $X2=227.77$) among drinkers. There was a gradual decrease in the percent of Heavy Drinkers from the first to the fourth years of college ($p < .05$, $X2 =8.1$). However, there was no significant difference in mean drinks consumed per week nor the number of problems related to drinking.

Grade Point Average (GPA): There was a significant inverse relationship between GPA and the percent of heavy drinkers. The lower the GPA the higher the percent who were heavy drinkers ($p < .001$, $X2 =143.9$). Those students with 4.0 GPAs consumed a third of the number of drinks compared to those with GPAs under 2.0 ($p < .001$, $F=38.5$). Among this group almost a half were heavy drinkers. Those with the lowest GPAs ($p < .001$, $t=6.1$) had the highest mean problems related to drinking.

Pledge/member of fraternity/sorority (Greeks): A higher percent of Greek drinkers were Heavy Drinkers compared to non-members ($p < .001$, $X2 =97.4$). In addition they consumed almost twice as many drinks per week compared to non-Greeks ($p < .001$, $t=15.6$) and had higher mean problems related to alcohol scores.

Demographic Characteristics of Institutions Students attended

Region of the country: Among drinker, the percentage of Heavy Drinkers ($p < .001$ $X2 =151.5$) was greatest in the North Eastern portion of the country, followed by the North Central, Southern and Western areas. However, there were no significant difference in alcohol consumption between the four regions of the country nor in problems related to drinking.

Community size, Type of School, School-size: Among drinkers, a significantly ($p < .001$ $X2 =46.7$) higher percent of students were heavy drinkers from communities under 100,000. Students in these small cities consumed significantly ($p < .001$, $F=24.2$) more alcohol and had higher mean alcohol related problem scores small communities ($p < .05$, $F=22.2$). Slightly more private than public school students were Heavy Drinkers ($p < .001$, $X^2 =14.7$). There was no difference in amount consumed but there was significant difference in problems ($p < .05$, $t=3.2$) related to drinking. There

was also a significant difference between the percent of heavy drinkers by size of school ($p < .001$, $X^2 = 15.7$). There was no difference in the mean drinks per week or the number of problems related to alcohol.

Drinking patterns and problems over 12 years

Drinking Patterns

Table 2 reveals that among the total sample of students, there was a significant difference ($p < .001$, df=8, $X^2=276.2$) over the twelve year time span in the percent of students exhibiting different drinking patterns. There was an increase in the percent of Abstainers (17.7% to 26.8%) while there was a decrease in the percent of Light-Moderate Drinkers (61.8 to 51.9). There was little change in the proportion of Heavy Drinkers (20.5 to 21.3).

Table 3 shows that among drinkers, a significant decrease in the mean number of drinks consumed per week ($p < .001$), was found with mean drinks decreasing from 14.3 in 1982-1983 to 13.1 in 1993-1994. (The post-hoc Scheffe indicated that there was a significant difference between all groups with the exception of the 1982-1983 and 1984-1985 time period and the 1990-1991 and 1993-1994 time period.) Among Light-to Moderate Drinkers there was a decrease from 8.4 to 6.0 drinks per week. (The significant groups were the first two with all later time periods and the third time period (1987-1988) with the last two time periods.) Among Heavy Drinkers the decrease was from 32.1 to 30.6 drinks per week was found (The significant differences were between the first two and all other time periods and the third with the last time period).

Problems related to drinking

Drinking/Driving: There was a significant decrease over the twelve year time period in the percent of students who reported driving a car after consuming several drinks ($p < .001$, $X^2 = 565.4$), having driven a car when they knew they had drunk too much ($p < .001$, $X^2 = 214.5$), and having driven a car while drinking ($p < .001$, $X^2 = 712.9$). There was no change in the proportion who reported they had been arrested for driving while intoxicated (see Table 4).

Health/Personal: Health or personal problems related to drinking either increased or remained the same over the twelve year period. The percent who had vomited ($p < .001$ $X^2 = 145.2$), or had been criticized by someone they were dating because of their drinking ($p < .001$ $X^2 = 62.2$) increased. The percentage who had experienced a hangover ($p < .001$, $X^2 = 26.5$) or had thought they might have had a problem with their drinking ($p < .001$ $X^2 = 19.9$) appears to have first increased and then decreased to near 1982-1983 and 1984-1985 levels.

Social/Academic: The proportion of students who have come to class after having several drinks ($p < .05$ $X^2 = 16.9$) decreased. However, the percent who cut a class after having several drinks ($p < .001$ $X^2 = 30.8$), missed a class because of a hangover ($p < .001$ $X^2 = 34.1$), or received a lower grade because of drinking too much ($p < .001$ $X^2 = 29.6$) increased significantly.

Legal/Violent: After an increase during the 1987-1988 time period, all legal/violent problems appear to have plateaued. This problems category consists of experiencing trouble with the law because of drinking, ($p < .001$ $X^2 = 95.2$), getting into trouble with school administration because of behaviour resulting from drinking too much ($p < .05$ $X^2 = 10.3$), getting into a fight after drinking ($p < .001$ $X^2 = 112.3$), and damaging property, pulling a false fire alarm, or "other such behaviour" ($p < .05$ $X^2 = 13.7$).

DISCUSSION AND CONCLUSIONS

A significant difference in drinking patterns for all demographic groups was found for the 1993-4 sample of American students. In terms of mean drinks per week there were no differences in consumption due to age, type of school, and school size. For the number of drinking related problems there were no differences due to age, year in school, region of the country and size of school. The major findings were that whites, males, Catholics, the non-religious, those with low grade point average, those affiliated with fraternities/sororities, those attending colleges located in the Northeast, private institutions, enrollment under 10,000 and in small communities were most at risk for heavier drinking. These results do not indicate dramatic changes in drinking patterns between most of the demographic groups as these results have been found over the past two decades by various researchers.

Although there have been social changes which have given women more freedom for career choices and independence, this was not reflected in a smaller gap between male and female students in this sample in regards to alcohol consumption. The higher percent of underage students classified as heavy drinkers can perhaps be explained by Reactance Theory (Engs and Hanson, 1990; Allen, Sprenkel and Vitale, 1994). Drinking is perceived as part of the college experience by most students. Prohibition of alcohol for those under the age of 21, makes it more alluring since it is illegal. Since students feel they have the right to drink, illicit alcohol consumption has gone "underground" away from adult monitoring. Because these illegal drinkers do not have adult social pressure to limit their consumption to more moderate levels, they are likely to consume more drinks on the fewer occasions when alcohol is available. The decrease in percent of students who are heavy drinkers and mean drinks per week consumed from freshmen to seniors may also supports reactance theory.

In terms of drinking over the 12 year time span, even though there was an increase in the proportion of abstaining students and a continuing decrease in average consumption levels among those who choose to drink, there was not a decrease in drinking problems except for those related to drinking and driving. This decrease in drinking and driving related problems also reflects the national trend which

has been found since the early 1980s (General Accounting Office, 1987). These results appear to support the reduction of consumption theory **only for the drinking and driving related variables**. However, control of consumption theory is not supported for other problems related to abusive drinking.

It is important to examine why drinking and driving related variables continuously decreased while other problems related to alcohol have not among this sample. The continued decrease in the percent of students who reported drinking and driving problems is likely to have resulted from a combination of education and prevention programming. There has been increased awareness among university students that intoxication and driving are dangerous. Efforts on the part of many groups, including student organizations such as Boost Alcohol Consciousness among College and University Students (BACCHUS), have encouraged designated driver and related programmes. The media, through continual public service announcements, have reinforced awareness of the dangers of driving drunk. All these factors are likely to have affected the decrease in drinking and driving problems.

On the other hand, health and personal problems have either increased or leveled off. Three social and academic problems increased. Legal and violence related problems started to increase at the 1987-1988 period and appears to have stabilized (Engs and Hanson, 1994). These results do not support reduction of consumption theory, which would predict a gradual decrease over the decade, especially after 1987, when the legal purchase age for alcohol was mandated as 21 years of age.

In conclusion, the results do not support the hypothesis that few differences would be found within traditional demographic variables due to societal changes. Likewise few changes over a 12 year time period for behavior problems resulting from drinking, other than decrease in drinking and driving variables, were found. It was concluded that the Reduction of Consumption hypothesis was supported only by the drinking and driving variables in these samples and that fewer students consumed alcohol.

Engs, Drinking patterns of American university student: testing reduction of consumption theory 1983 1994. Paper presented, Dundee, Scotland, 1994

Table 1: Chi-Square results of the percent of students who are light/moderate or heavy drinkers and the comparison of the mean drinks and mean problems per week within each demographic characteristic for those who drink at least once a year using t-tests and one-way ANOVA.

	N	Light/ Moderate	Heavy	Mean drinks per week	(sd)	Number of problems	(sd)
PERSONAL DEMOGRAPHIC CHARACTERISTICS							
Gender							
Males	3630	56.9	43.1*	14.3	(17.1)*	3.4	(3.4)*
Females	5071	82.1	17.9	6.6	(10.6)	2.0	(2.4)
Race							
White	7544	69.6	30.4*	10.6	(14.4)*	2.7	(3.0)*
Non-white	1045	84.1	15.9	4.2	(10.1)	1.1	(3.5)
Age							
Under 21	4841	68.4	31.6*	9.5	(14.0)	2.4	(2.9)
Over 21	3868	75.6	24.4	9.0	(13.8)	2.5	(2.9)
Religious background							
Catholic							
Jewish	3244	66.8	33.2*	12.4	(14.7)*	3.1	(3.0)*
Protestant,	197	71.1	28.9	13.0	(16.7)	2.7	(2.9)
drinkers	2561	72.7	27.3	10.2	(14.1)	2.7	(3.0)
Protestant							
Non-drinking beliefs	1348	77.7	22.3	5.7	(11.4)	1.8	(2.7)
Importance of Religion							
Very	5315	75.1	24.9*	5.3	(11.2)*	1.6	(2.6)*
Not	3348	65.9	34.1	10.4	(13.5)	2.8	(2.8)
ACADEMIC/SOCIAL DEMOGRAPHIC CHARACTERISTICS:							
Class year							
Freshman	2152	70.4	29.6+	8.6	(14.2)+	2.0	(2.7)
Sophomore	2059	70.0	30.0	9.6	(14.0)	2.5	(2.9)
Junior	2262	71.8	28.2	10.0	(13.7)	2.7	(2.9)
Senior	2036	73.6	26.4	10.7	(14.0)	2.9	(2.9)
Grade Point Average							
4.0	317	85.2	14.8*	5.9	(14.5)*	1.4	(2.4)*
3.5	1608	78.1	21.9	7.6	(12.4)	2.0	(2.6)
3.0	3285	73.3	26.7	9.2	(13.6)	2.4	(2.8)
2.5	2502	66.9	33.1	11.4	(14.4)	3.1	(3.1)
2.0	620	62.4	37.6	12.2	(16.4)	3.1	(3.2)
<2.0	135	52.6	47.4	14.8	(18.8)	3.7	(3.7)

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TABLE 1 Continued	N	Light/ Mod	Heavy	Mean Drinks	(sd)	Mean Prob	(sd)
Member/pledge of fraternity/sorority							
Member	1509	61.3	38.7*	15.4	(17.0)*	3.6	(3.2)*
Non-member	7111	73.9	26.1	8.6	(13.1)	2.3	(2.8)
INSTITUTIONAL CHARACTERISTICS							
Region of country							
Northeast	2277	63.5	36.5*	13.6	(15.0)	3.1	(2.9)
North central	2772	70.0	30.0	11.6	(14.5)	3.0	(2.9)
South	2170	76.0	24.0	9.4	(14.2)	2.7	(2.9)
West	1492	80.2	19.8	8.4	(13.1)	2.6	(2.8)
Community-Size Institution located in							
<100,000	6222	69.5	30.5*	10.2	(10.6)*	2.6	(2.9)+
100-500,000	1642	75.8	24.2	8.2	(9.8)	2.2	(2.9)
>500,000	846	78.7	21.3	8.3	(9.2)	2.2	(2.8)
Type of School							
Public	7258	72.5	27.5*	9.6	(14.0)	2.6	(2.9)+
Private	1310	67.3	32.7	9.8	(14.6)	2.3	(3.0)
School-Size							
<10,000	5879	70.5	29.5+	9.7	(14.5)	2.5	(3.0)
>10,000	2832	73.8	26.2	9.5	(13.0)	2.6	(2.8)
TOTAL [a]	8711	72.6	28.4	10.9	(13.7)	2.5	(2.9)

***** p<.001 **+** p<.05

a. Note sample size in each category do not necessarily add up to the total sample due to missing data for each analysis.

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TABLE 2: Chi-square results comparing the percent of university students who were Abstainers, Light to Moderate, and Heavy Drinkers over five time periods. [a]

Quantity/Frequency Level	**1982-83** N=5978 %	**1984-85** N=5209 %	**1987-88** N=7480 %	**1990-91** N=7221 %	**1993-94** N=11529 %
Abstainers (N=8296)	17.7	10.4	20.9	21.6	26.8*
Light-Moderate (N=21,245)	61.8	59.8	57.6	56.9	51.9
Heavy Drinkers (N=7957)	20.5	20.8	21.5	21.5	21.3

* $p < .001$, a. $X^2 = 276.2$, df=8

TABLE 3: One-way analysis of variance of the mean drinks per week among the Light-Moderate, Heavy and all drinkers over the five time periods.

	1982-83 (N=4,930) X (sd)	**1984-85** (N=4,218) X (sd)	**1987-88** (N=5,935) X (sd)	**1990-91** (N=5,682) X (sd)	**1993-94** (N=8,517) X (sd)
Light- Moderate (N=21,341)	8.4 (8.9)	8.2 (8.8)	7.1 (8.1)	6.5 (7.9)	6.0 (7.5)[a]
Heavy (N=7,941)	32.1 (15.5)	31.5 (14.3)	30.7 (14.3)	29.5 (12.7)	30.6 (14.2)[b]
All Drinkers (N=29282)	14.3 (14.9)	14.2 (14.6)	13.5 (14.6)	12.8 (13.9)	13.1 (14.9)[c]

a. $p < .001$, F = 70.4, Between groups: Mean squares = 4657.9 df=4, Within groups: Mean squares = 66.2, df=33840. Scheffe difference = 1982-83 & 1984-85 with 1987-88 and 1993-94, 1978-88 with 1990-91 and with 1993-94.

b. $p < .001$, F = 6.4, Between groups: Mean squares = 1286.4 df=4, Within groups: Mean squares = 200.5, df=7936 Scheffe difference = 1982-83 & 1984-85 with 1987-88 and 1993-94, 1978-88 with 1993-94.

c. $p < .001$, F = 10.6, Between groups: Mean squares = 2290.4 df=4, Within groups: Mean squares = 214.1, df=29281. Scheffe difference = 1982-83 & 1984-85 with 1990-91 & 1993-94

TABLE 4: Chi square results comparing the percent of drinkers over the five time periods who had experienced each of the problems related to drinking at least once during the previous 12 months.

	82-83	84-85	87-88	90-91	93-94
Drinking/Driving					
Driven a car after having had several drinks	59.6	54.5	48.8	42.9	40.9*
Driven a car when they knew they had drunk too much	40.6	37.0	33.9	31.0	29.1*
Driven a car while drinking	48.0	40.9	36.7	31.2	26.8*
Been arrested for driving while intoxicated	1.3	1.1	1.4	1.2	1.2
Health/Personal					
Had a hangover	72.3	73.0	75.3	75.6	72.9*
Vomited as a result of drinking	45.3	46.8	51.3	53.2	54.5*
Criticized by someone they were dating because of their drinking	11.4	10.8	13.5	12.7	15.1*
Thought they might have a problem with their drinking	9.3	8.2	10.3	9.7	8.5*
Social/Academic					
Came to class after having several drinks	8.5	85.	8.5	7.0	7.4+
"Cut a class" after having several drinks	9.1	10.8	9.3	9.9	11.6*
Missed a class because of a hangover	23.3	26.8	26.6	27.0	27.8*
Got a lower grade because of drinking too much	4.7	6.0	5.8	5.8	7.0*
Legal/Violence					
Had trouble with the law because of drinking	4.4	3.9	6.1	7.6	7.1
Got into trouble with school administration because of behavior resulting from drinking too much	1.9	1.8	2.5	2.2	2.5+
Got into a fight after drinking	11.7	12.1	14.8	17.2	16.7*
Damaged property, pulled a false fire alarm, or other such behavior	9.6	9.7	11.5	10.6	10.4+

*p < .001 +p < .05

Tables and material from R.C. Engs, Indiana University, Bloomington and D. J. Hanson, SUNY, Potsdam, NY, studies from 1982-1994 data collections.

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